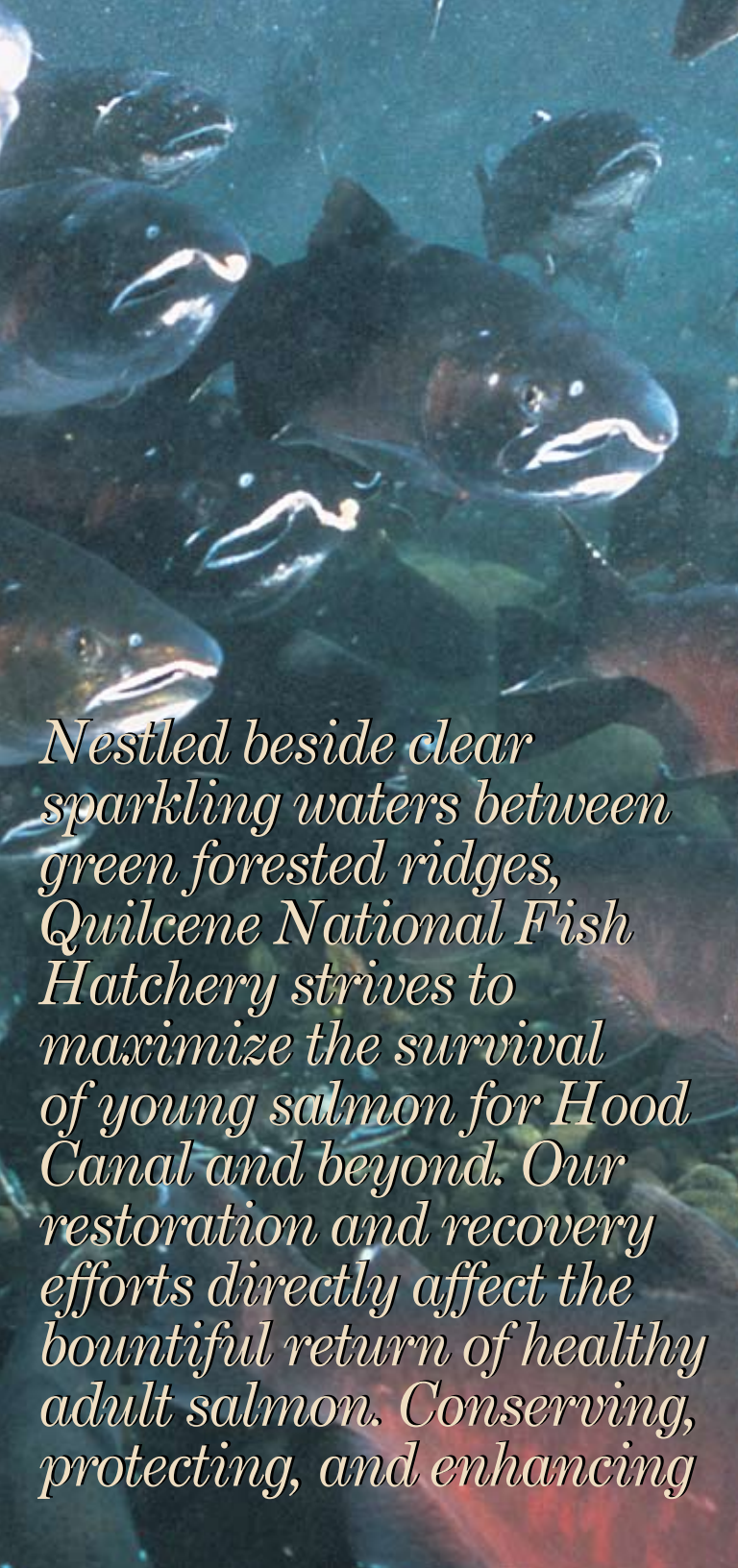


U.S. Fish & Wildlife Service

# Quilcene

*National Fish Hatchery*





*Nestled beside clear sparkling waters between green forested ridges, Quilcene National Fish Hatchery strives to maximize the survival of young salmon for Hood Canal and beyond. Our restoration and recovery efforts directly affect the bountiful return of healthy adult salmon. Conserving, protecting, and enhancing*



*returning runs of salmon  
for cultural, recreational,  
and other beneficial  
purposes for all Americans  
is our mission; our legacy!*

*Background Photo: © Chris Huss*



# Visiting The Hatchery

## Area Locator

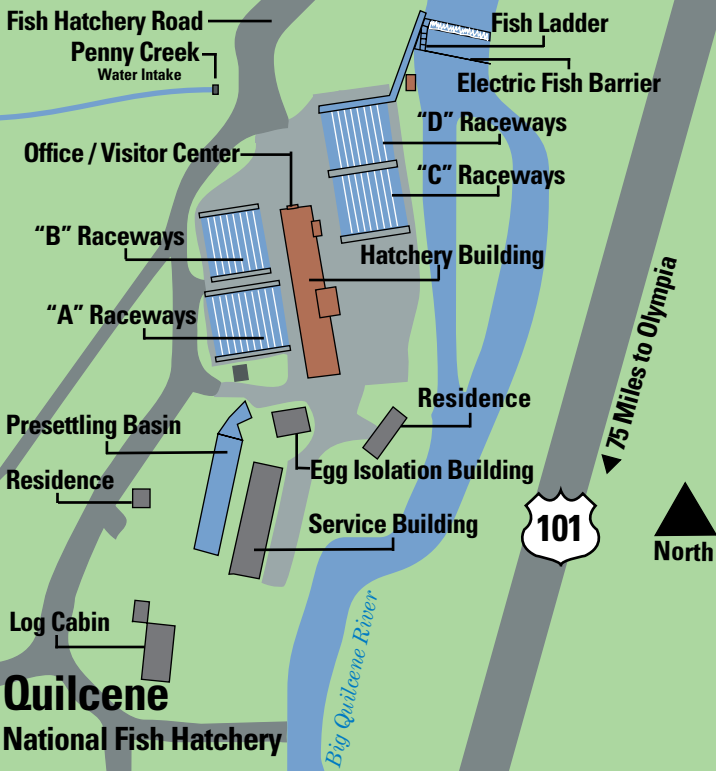


Quilcene National Fish Hatchery is located on a beautiful section of the Quilcene River 2 miles south of the town of Quilcene, Washington, on U.S. Highway 101, or 75 miles north of Olympia, Washington on U.S. 101.

The hatchery is open to the public on weekdays and some weekends during various times of the year. Please call

the phone number on the back cover for hours. Conducted tours for schools and other groups can be arranged, by calling the office in advance.

To view spawning operations, please call ahead to plan your visit during optimum spawning times, from late September through early November.



# Introduction

## Welcome

Quilcene National Fish Hatchery (NFH) is operated by the Fish and Wildlife Service of the U.S. Department of the Interior. Originally established in 1909 as one of “two or more fish culture stations on Puget Sound, or its tributaries in the State of Washington, for the propagation of salmon and other food fishes.” The hatchery’s specific mission is to restore and enhance fish runs in the Hood Canal and north coast areas. Quilcene is one of three national fish hatcheries on the Olympic Peninsula.



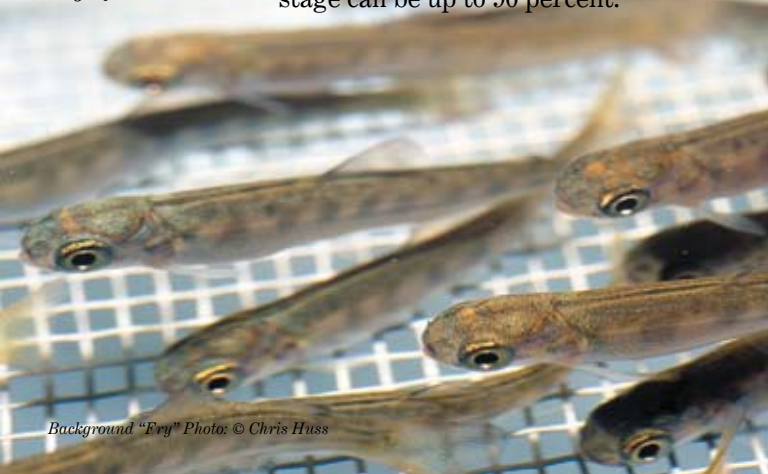
*Photo: FWS-Ron Wong*

## A Long History of Fish Culture

The hatchery was completed in 1911. Since then we have raised many species of fish including: coho, chum, pink, Chinook, and sockeye salmon; and brook, cutthroat, and rainbow trout. These fish were distributed into streams and rivers flowing into Hood Canal and the Strait of Juan de Fuca.

Currently coho salmon and steelhead trout are raised on site. 400,000 coho, equal to 20,000 pounds, are released annually directly into the Big Quilcene River. Another 200,000 coho, equal to 9,000 lbs, are transferred to the Skokomish tribal net pen in Quilcene Bay each spring. In the wild, about 15 percent of the fish survive to the fry stage, while hatchery survival to fry stage can be up to 90 percent.

*At the hatchery many more fry survive to be released into the Big Quilcene River*



*Background “Fry” Photo: © Chris Huss*

## Hatchery Species Distinctions

**How can you tell which fish is which?**

How can you tell which is which? In many ways, the life histories of Pacific salmon are similar. All are born in fresh water and spend their early lives there (freshwater phase), migrate to the sea (ocean phase) where they grow to adult size and then return to their home streams to spawn.

### Coho Salmon



*Ocean Phase*



*Male - Freshwater Phase*



*Female - Freshwater Phase*

**Length:** Ranges from 10 to 32 inches.

**Weight:** 6 lbs average; 25.34 lb. is the state record catch in saltwater in the state of Washington.

**Identifying Features:** When the fish first enter the fish hatchery and when they are in the ocean, they are silvery. They have small black spots on their backs and upper lobe of the tail fin. The gums at the base of the teeth are white. When ready to spawn an amazing transformation takes place. Males sport bright red



Photo: © Chris Huss

flanks, dark heads, bellies, backs and develop a grotesquely hooked snout called a “kype;” females retain a more rounded snout, and are an olive color with grey bellies. The gums of both remain white - very noticeable when the fish are in their dark spawning colors.

*Adult coho, silvery when they first return, undergo a dramatic transformation for spawning.*

**Life History:** Most coho spend 1.5 years in fresh water and 1.5 years at sea, although a small percentage of males, called “jacks,” stay only 6 months in salt water. Unlike other salmon fry, young coho are colorful, with golden bodies and orange fins. Some fins may be bordered with white then black behind. Their colors aid them in territorial displays; they are the most aggressive of all salmon fry, both to their own and other species. Once in the ocean, they range from northern California to Alaska. Coho are very powerful, and can jump water falls that most salmon cannot negotiate. They migrate back to their “home stream,” in late summer and fall then spawn from late September through the beginning of November.

*Typical salmon purse-seine net fishing vessel in the near shore fishery.*

An average of 6.9% of the fish released from Quilcene NFH survive to return to the hatchery, or are caught in the near shore fisheries off the coast of Canada and Washington.



Photo: FWS

## Steelhead Trout



**Length:** Ranges from 26 to 32 inches.

**Weight:** 7-10 lbs average, 35 lb-1oz.  
is the Washington state record catch  
from the Snake River.

**Identifying Features:** Steelhead are simply a form of rainbow trout that migrate to salt water when young, then return as adults as spawning nears. The adult steelhead are silver when they return to the river at 4 or 5 years of age. “Summer” steelhead return in the summer and slowly reach reproductive maturity within the river. Steelhead that spawn far inland via the Columbia River are almost exclusively summer run fish. “Winter” steelhead predominate in coastal streams, reaching reproductive maturity in the ocean they spend much less time in fresh water before spawning. Both forms spawn in the springtime.

Unlike salmon, steelhead have less of an elliptical or “football” body shape. They tend to be more uniformly straight along their body length. They also do not necessarily die after spawning as do the Pacific species of salmon, though the heavy stress of spawning will most likely result in their death. Females typically produce 1,000 eggs per pound of body weight. Those that do survive to spawn again are referred to as “kelts.”

In 2007, a new program was initiated at Quilcene NFH propagating Hood Canal winter steelhead which are





*Photo: FWS-Chris Pasley*

*“A beautiful  
Steelhead!”*

listed as “Threatened” under the Endangered Species Act. Our role in this program is eyed egg incubation and early rearing of Dewatto River and Duckabush River fish. Early each spring, surveys are conducted weekly to locate “redds” (fish nests). A small portion of the eyed eggs are collected by washing them free of the gravel and into a net positioned downstream. At the hatchery we disinfect the eggs in an iodine solution to kill any germs that may be present on their surface. Eggs from the two rivers are always kept separated. In late summer, the growing fish are transferred to a hatchery near Lilliwaup, WA operated by Long Live The Kings. There in larger tanks they rear most of the steelhead to be released at 2 years of age, but some will be kept until adulthood and released to spawn in the river.

We are very optimistic our efforts will greatly benefit these fish by increasing their populations in the wild. At the hatchery, the fish are shielded from diseases and predators, and when released at 2 years of age they will be ready to quickly leave for the ocean, having a much better chance of surviving to adulthood and reproducing.

Annual egg collections are limited to 8,620 eyed eggs from the Duckabush River, and 9,566 eyed eggs from the Dewatto River.

# Learning From The Past

## Fish Culture Then and Now



*Quilcene NFH  
in 1938*

*Background:  
Historical photo  
circa, 1938 - 39  
mixing milt  
and eggs for  
fertilization*

Early methods of fish culture were primitive. Hatcherymen would hang parts of horse or cow carcasses on the fish pond, flies would then lay eggs in the decaying flesh and the maggots would fall off into the water, feeding the fish.

Fish feed was initially made at the fish hatchery, by grinding up fish carcasses and beef liver, adding salt, and vitamins. Today, commercial fish feed manufacturers prepare specialized fish food for different species and sizes of fish (from fry to adult). The fish food manufactured in the form of a pellet that is loaded with nutrients to ensure healthier fish stocks and a higher survival rate.

When hatcheries first began operating there were also many questions dealing with fish diseases. What caused them? How do we prevent them? How do we treat the sick fish? Research has answered some of these questions and we continue to evaluate and update our growing knowledge.

Today fish pathologists monitor our fish routinely and are available on call to address any abnormal fish behavior or elevation in mortality. Abnormal behavior can be an indication of the fish starting to get sick. The fish pathologist then recommends treatments for specific fish diseases and gives advice on how to prevent or minimize the impacts of disease on fish populations.

*Fish at the  
hatchery are  
monitored for  
diseases and  
parasites*



## The Hatchery Today



Each year, after spending 1-1/2 years in the ocean, adult coho salmon return to the hatchery during the months of August through November. An electric fish weir guides them to the fish ladder and into the holding pond. Each fish is checked by hand, separating out those ready to spawn from the unripe fish. Unripe fish are put back in to the pond and checked weekly until ready to spawn. In nature, all Pacific salmon die after spawning, so ripe fish are killed to collect milt (sperm) from male salmon and eggs from the females. Fish are spawned according to genetic guidelines which will guarantee the long-term survival of that particular species. Returning coho salmon that are in excess of the number needed for spawning are utilized as food by tribal communities.

Female fish are cut opened to release their eggs, then milt is stripped from a male and mixed with the eggs. Water is added to the eggs and milt mixture to help activate the sperm, and fertilization takes place almost immediately thereafter. Samples taken throughout the egg collection process are checked for diseases by a fish pathologist to insure healthy offspring. A fish pathologist checks the fish development monthly, watching for any diseases.

*Male coho salmon in ripe spawning color*

*Taking eggs from adult coho salmon*



Photo: FWS-Ron Wong

*Adding Milt (sperm) to fertilize the eggs*



Photo: FWS-Ron Wong

## Modern Methods



Photo: FWS-Ron Wong

*Eyed eggs being inventoried and prepared for hatching*

*Sac-fry with yolk sac*



Photo: FWS-Anette Otness

*Buttoned up sac-fry*

*Background photo shows eyed eggs, photos to right show the transformation into sac-fry. Note the clear eggshell around head of hatching fry.*

Background photo: FWS-Ron Wong

All fertilized eggs are taken to the incubation building, disinfected and poured into incubator trays. Clean, cold, oxygen-rich water runs through the incubators imitating the flow of a natural stream environment.

Hatcheries provide a safe environment for the development of salmon eggs, sac fry, fingerlings and smolts. The hatchery can increase the survival rate of the salmon through the smolt stage in their life cycle. In the wild, up to 85 percent of the eggs do not survive to the fry stage, while hatchery loss to the same fry stage is about 10 percent. Up to a 90 percent hatchery survival rate could mean many more returning adults.

The warmer the water temperature the faster the eggs develop. After about 50 days at 50 degrees Fahrenheit the eggs hatch into "sac fry," larval fish with sacs of egg yolk attached to their bellies. The yolk sustains the fish for several weeks (they are not fed during this time). In the wild, they would stay hidden in their gravel nests.



Above photos: © Chris Huss/[www.chrishuss.com](http://www.chrishuss.com)





Photo: FWS-Paul Kaiser

*\*Coho “fry”*

When the yolk is completely absorbed, the young salmon are now at the “fry” stage. \*Note the golden hue on the body with generally orange fins. The anal fin has a bright white leading edge bordered by a parallel black stripe. Transferred to nursery tanks or outdoor raceways they are fed nutritious pelleted food containing fish, grain meal and vitamins.



Photo: FWS-Paul Kaiser

*\*\*Coho “smolt”*

At approximately eighteen months juvenile spots disappear, scales turn silvery and loosen, fins fade to pale yellow or clear, and the tail fin develops a darkened rear border; the fish is ready to begin the downstream journey to the ocean. \*\*The fish are called “smolts” at this stage.

Hatchery smolts are released in the spring (May), matching the wild smolt migration. The fish move passively downstream under the cover of darkness as the pull of river currents flow to the sea. Smolts linger in estuary areas where fresh and salt water mix, for several weeks. Once acclimated to salt water, they head out to sea. In about 1 to 4 years, depending upon the species, they return to the Big Quilcene River to begin the cycle again.

Some have coded tags that identify them

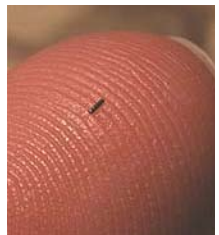
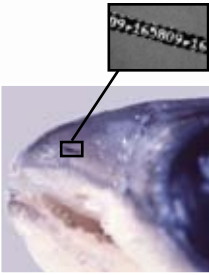


Photo: FWS-Dave Zajac

*Coded wire tags (size shown above) are inserted in the nose of some released smolts.*

Photo: FWS-Dave Zajac



when they come back to spawn. Smolts tagged with these coded wire tags provide valuable information for research purposes when they return as adults. The wire tags are inserted painlessly into the smolts nose in a specially designed trailer; visitors are welcome to look in at this operation.



Photo: FWS-Ron Wong



Photo: FWS-Ron Wong

## Partners for the future!

*Partnering contributes to the continuing abundant return of salmon.*

The production program at Quilcene NFH is a cooperative venture involving several partners: Tribes, Point No Point Treaty Council, the Washington Department of Fish and Wildlife, the U.S. Fish and Wildlife Service Western Washington Office, the Olympia Fish Health Center, NOAA Fisheries and other federal offices. Partners among non-Governmental organizations include Long Live The Kings and the Hood Canal Salmon Enhancement Group. Any changes in fish production programs must adhere to several management plans and are developed collaboratively. We work together closely, generation to generation, for the benefit of both the people and the salmon!

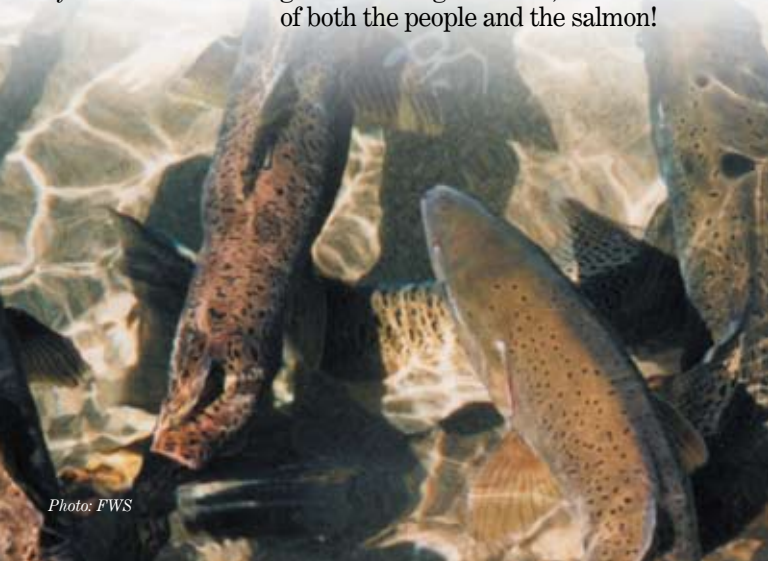


Photo: FWS

## Olympic Peninsula Activities



### Enjoy Nature From Mountain Tops to Ocean Beaches

Mt. Walker, just south of the hatchery, is an observation area at an elevation of 3,000 feet. It is the only peak overlooking the Puget Sound with a road to the top. The 5-mile drive to this observation area, managed by the U.S. Forest Service, has a number of picnic areas available. Several U.S. Forest Service campgrounds are also located south of the hatchery on Highway 101.

Olympic National Park is 48 miles to the northwest at Port Angeles. The rugged Olympic range is an unspoiled wilderness with high lakes, fishing, camping facilities, skiing and hiking. Washington Maritime National Wildlife Refuge is also in the Port Angeles area, and offers numerous outdoor activities.

The Olympic Peninsula abounds with unmatched natural beauty, snow-capped mountains, clear streams, numerous lakes, sandy beaches, and majestic rain forests. While exploring the natural beauty of our area you are welcome to visit Makah and Quinalt, the other two national fish hatcheries on the Olympic Peninsula. They are along the scenic route around one of the nations largest wilderness areas.

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